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1933

## Motor Car Engineering (1st Year): Technical School Examinations 1933

Department of Education: Technical Instruction Branch

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# COURSE IN MOTOR CAR ENGINEERING.

(69)

AN ROINN OIDEACHAIS.  
(Department of Education.)

BRAINSE AN CHEARD-OIDEACHAIS.  
(Technical Instruction Branch.)

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TECHNICAL SCHOOL EXAMINATIONS.  
1933.

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MOTOR CAR ENGINEERING.  
(First Year.)

*Monday, May 1st—7 p.m. to 10 p.m.*

*Examiner*—RICHARD COULSON, ESQ., A.R.C.SC.I., M.S.A.E.

*Co-Examiner*—J. P. HACKETT, ESQ., B.E., A.R.C.SC.I.

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## GENERAL INSTRUCTIONS.

You are carefully to enter on the Answer Book and Envelope supplied your Examination Number and the subject of examination, but you are not to write your name on either. No credit will be given for any Answer Book upon which your name is written, or upon which your Examination Number is not written.

You must not have with you any book, notes or scribbling paper.

You are not allowed to write or make any marks upon your paper of questions.

You must not, under any circumstances whatever, speak to or communicate with another candidate; and no explanation of the subject of the examination may be asked for or given.

You must remain seated until your Answer Book has been taken up, and then leave the examination-room quietly. You will not be permitted to leave before the expiration of twenty minutes from the beginning of the examination, and will not be re-admitted after having once left the room.

If you break any of these rules, or use any unfair means, you are liable to be dismissed from the examination, and your examination may be cancelled by the Department.

*Three hours allowed for this paper. Answer Books, unless previously given up, will be collected at 10 p.m.*

## INSTRUCTIONS.

(101) Read the General Instructions on page 1.

You are not permitted to attempt more than SEVEN questions.

Write the number of the question before the answer.

Do not re-write the questions in the answer book

The use of drawing instruments is allowed.

1. Explain what is meant by an *internal* combustion engine and give the sequence of operations in the cylinder of such an engine working on the four-stroke cycle.

How many explosive charges will be fired per minute in a six-cylinder engine, working on the four-stroke cycle, running at 1,500 r.p.m.? [45 marks.]

2. Shew, on a circular diagram, approximate positions for the opening and closing of the valves of a four-stroke cycle engine in relation to the top and bottom dead centres. Explain why it is advisable to open and close the valves at the positions you shew. [45 marks.]

3. Sketch two methods of retaining gudgeon pins in position and explain what is liable to happen, with the consequent effect on the running of an engine, if a failure occurs in this respect. [40 marks.]

4. Why is it necessary to drain off and replace periodically the oil in a petrol engine crankcase? How frequently, reckoned in mileage, should this be done and why is it inadvisable to flush the crankcase with paraffin when making the change? [40 marks.]

5. Make a rough sectional sketch of one of the principal types of clutch fitted to present-day cars. Give a list of the probable causes of slip in such a clutch and say how you would remedy each. [45 marks.]

6. Describe and illustrate with a sketch, a universal joint of the fabric ring or disc type. Shew clearly the connection between the disc and each of the shafts it joins. [40 marks.]

7. Shew, on diagrammatic chassis views, the complete connections of a mechanically operated brake system, from the operating pedal or lever to the camshafts in the drums. [40 marks.]

8. Mention some of the conditions likely to lead to excessive tyre wear and describe how you would check the alignment of the front wheels of a car. [40 marks.]

9. Give a list of the places at which loss of compression in an engine cylinder and combustion chamber may take place; state the probable reason for the loss in each case, and how you would remedy it. [45 marks.]

10. Describe briefly the two systems in use for circulating the cooling water in the cylinder jackets and the radiator; include in your description a sketch of the pump used with one of the systems. [40 marks.]